CONCLUSION: Existing epidemiological data can provide tailored estimates of concrete benefits resulting from improving the quality of anticoagulation.

CV2

A SIX YEAR FOLLOW-UP STUDY OF THE RELATIONSHIP BETWEEN MORTALITY, HOSPITALISATION AND ADHERENCE TO STATIN TREATMENT AFTER FIRST MYOCARDIAL INFARCTION

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OBJECTIVE: To measure adherence to statins by patients treated for secondary prevention after myocardial infarction and to estimate the effect of adherence on outcome.
METHODS: We used a cohort design in the population of Tayside, Scotland. Patients who experienced their first MI between January 1990 and November 1995 were identified from hospital discharge data. We used two outcomes: mortality from any cause; hospitalization for recurrent MI. Adherence to statins was calculated as the number of days for which statins were supplied divided by the total number of days in the study for each patient. Results were adjusted for age, sex, deprivation (as measured by the Carstairs code), serum cholesterol level, diabetes mellitus, cardiovascular drugs and other hospitalization using a Cox regression model.
RESULTS: Of 5590 patients enrolled in the cohort 1299 (23.2%) died during the follow-up period and 717 (12.8%) experienced at least one further MI. Only 7.7% of patients used statins, and in comparison with non-users, these patients had more cardiovascular risk factors. Compared to those not using statins, the adjusted relative risk of mortality (95% CI) by quintiles of adherence was 0.65 (0.24–1.80) for the worst adherence quintile, 0.46 (0.06–3.43) for the second, 1.03 (0.37–2.88) for the third, 0.19 (0.03–1.37) for the fourth, and 0.20 (0.09–0.47) for the best adherence quintile. The adjusted relative risks of readmission by quintiles of adherence were 0.65 (0.24–1.79) for the worst adherence quintile, 0.47 (0.06–3.51) for the second, 1.05 (0.37–2.94) for the third, 0.20 (0.03–1.41) for the fourth, and 0.21 (0.09–0.48) for the best adherence quintile.
CONCLUSIONS: Statins were used infrequently and use was a marker of cardiovascular risk. Despite such confounding by indication, good adherence to treatment was associated with lower risks of further MI and lower mortality.

CV3

VASOPEPTIDASE INHIBITOR REDUCES IN-HOSPITAL COSTS FOR CONGESTIVE HEART FAILURE PATIENTS: RESULTS FROM THE IMPRESS TRIAL

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OBJECTIVE: The IMPRESS clinical trial randomized patients with congestive heart failure to a daily regimen of either omapatrilat or lisinopril. At 24 weeks, patients randomized to omapatrilat had a significant reduction in the primary endpoint of death, hospitalization, or discontinuation of study drug for worsening heart failure (p = .035) and fewer cardiac events (p = .04). This study sought to determine the economic consequences of the omapatrilat patient's lower event rates.
METHODS: Economic outcomes were assessed in terms of hospitalization events and their medical costs. Hospital event information was obtained via serious adverse event forms, and hospital costs were evaluated by assigning each hospitalization a DRG-based average cost for physician and hospital services. Emergency room visits for worsening heart failure were assigned costs equivalent to those at Duke University Medical Center. All costs were expressed in 1998 US dollars. Drug costs were not assessed.
RESULTS: Patients in the omapatrilat (n = 289) and lisinopril (n = 284) arms were evenly matched with regard to baseline characteristics: age (both 64 years); NYHA class III or IV heart failure (36% versus 38%); ejection fraction (both 28%). There was no difference between study arms in all-cause mortality. However, there was a trend toward a greater number of all-cause hospitalizations in the lisinopril versus omapatrilat patients (0.275 versus 0.215, p = .07). Differences in cardiac hospitalizations between lisinopril and omapatrilat were significant (0.208 versus 0.145, p = .03). There was a trend toward reduced medical costs at 24 weeks follow-up in omapatrilat-treated patients (US$1930 versus US$2002, p = .09). Considering only cardiac medical costs, this trend toward reduced medical costs became significant (US$1240 versus US$1442, p = .03).
CONCLUSIONS: In the first study to compare economic outcomes in congestive heart failure patients treated with omapatrilat and lisinopril, we found fewer hospitalizations and lower medical costs for omapatrilat patients at 24 weeks.

COST ESTIMATION

CE1

IMPACT OF CENSORED COST DATA ON THE OUTCOMES OF ECONOMIC EVALUATIONS

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OBJECTIVE: Patients in a clinical trial who withdraw before the scheduled end date are a serious problem in economic evaluations. The method to deal with data from these patients can have important impact on out-

comes in terms of resource use and costs, especially when withdrawal rates differ between treatment groups. The aim of this study was to compare the impact of various methods for dealing with censored data on the total costs and on the difference in costs between treatment groups.
METHODS: Five methods for dealing with censored data were applied to data from 519 patients with chronic disease participating in a one-year randomized clinical trial. These five methods are complete case analysis, linear extrapolation, hot-decking, predicted regression, and multiple imputation.
RESULTS: Fifteen percent of the patients in treatment group A and 21% of the patients in treatment group B withdrew from the study before the scheduled end date. Mean costs per patient varied from €889 (SE: 94) in the complete-case analysis to €1400 (SE: 189) after predicted regression. Cost differences between treatment groups varied from €14 in the complete-case analysis, to €243 after multiple imputation, to €372 after predicted regression. Hot-decking, multiple imputation and predicted regression were sensitive to the selection of covariates.
CONCLUSION: The various methods had a considerable impact on total costs and on the difference in costs between treatment groups. In economic evaluations more attention should be paid to methods for dealing with censored patients and the impact of these different methods on the CE-ratio.

CE2

HANDLING MISSING DATA IN STOCHASTIC COST-EFFECTIVENESS ANALYSIS: THE IMPACT OF IMPUTATION METHODS ON ESTIMATES OF THE PHYSICAL QUANTITIES OF MEDICAL CARE RESOURCE USE

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OBJECTIVE: An issue that has recently received attention from health economists is how to handle the problem of missing data in stochastic cost-effectiveness analysis. The purpose of this paper is to highlight the impact that different approaches to the imputation of missing data can have on estimates of the physical quantities of medical care resource use.
METHODS: Medical care resource use data were collected prospectively in a six-month RCT comparing two treatments for a chronic condition that is characterized by acute episodes. Two approaches of the multiple imputation were used to address the problem of missing data. Method A relied on imputing missing data for total costs and then estimating the physical quantities of medical care resource use. Method B relied on imputing missing data for the physical quantities of medical care resource use and then estimating total costs. Results for physician and nurse visits and days in the hospital were reported.
RESULTS: The two multiple-imputation approaches produced different estimates of medical care resource use. The average number of physician and nurse visits and days in the hospital between the two groups were 5.7 vs. 5.3 physician visits, 1.0 vs. 0.9 nurse visits, and 4.0 vs. 4.7 days in the hospital determined with method A. The average number of physician and nurse visits and days in the hospital between the two groups were 6.0 vs. 6.3 physician visits, 1.2 vs. 1.3 nurse visits, and 4.0 vs. 5.0 days in the hospital using method B.
CONCLUSIONS: Medical care resource use estimates are sensitive to the imputation approach. Method B builds prediction models specifically for the utilization components under the imputation, and results from the imputed data sets may be less biased. It also provides more flexibility for analyzing the cost components.

CE3

THE COST OF UPPER GASTRODUODENAL ENDOSCOPY: AN ACTIVITY-BASED APPROACH

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OBJECTIVE: The cost of medical procedures is often unknown, but is nevertheless crucial for setting reimbursement and health-care policies. This study investigated the cost of an upper gastrointestinal endoscopy in ambulatory adults in a large academic hospital in the province of Québec, Canada from the perspective of the hospital.
METHODS: An activity-based costing methodology was used to break down the endoscopy procedure into a number of primary tasks to which were allocated resources used at the department level (labor, equipment, and materials). Unit costs per activity were calculated from detailed tracking of items and factors used for performing each task.
RESULTS: The direct cost of performing an endoscopy ranged from 62$Can (1Can$ = 0.75 EUR) for an unsedated, unbiopsied patient to 89$Can for a sedated, biopsied patient. Not included in this amount are separate reimbursement fees of 15$Can for biopsy analysis and 50$Can professional fees for the performing physician, which are charged directly to the Ministry of Health. A cost-volume function was constructed under two different hypotheses of divisibility (sharing between clinical units) or undivisibility of fixed equipment. This showed an optimal unit cost per procedure starting at around 3000 procedures a year for the installed equipment. Incorporating institutional overhead raises the cost of the procedure substantially by an amount of 41$ as does the use of non-reusable biopsy forceps, which adds about 63$Can to the total cost of the procedure.
CONCLUSION: Given the high proportion of overall hospital-wide overhead in the total cost of the procedure, allocation methods for these overheads in current hospital accounting systems should be improved in order to obtain more precise estimates of the full cost of medical procedures like upper gastrointestinal endoscopy. The